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OnEacWPI**(71) Applicant(s)**  
Reckitt & Colman Inc  
(Incorporated in USA - Delaware)One Philips Parkway, Montvale, New Jersey 07645,  
United States of America**(72) Inventor(s)**  
Josephine Telesco  
Jeanne Maria Wettler**(72) cont**  
Frank Anthony Lucia  
Tracy Ann Ryan  
Robert Henry Buckenmayer  
Walter Ronald Paul  
Ashwinkumar C Gandhi  
Stanislaw W Kopka**(74) Agent and/or Address for Service**  
N P Sanderson  
Reckitt & Colman Plc, Group Patents Department,  
Dansom Lane, HULL, HU8 7DS, United Kingdom**(54) Dry cleaning and freshening system****(57)** A dryer dry cleaning and freshening system comprises a containment bag, a dispenser means impregnated with liquid cleaning composition, and optionally an absorber capable of absorbing loose particles and excess cleaning composition. The system may be used in a home clothes dryer for dry cleaning.**GB 2 302 553 A**

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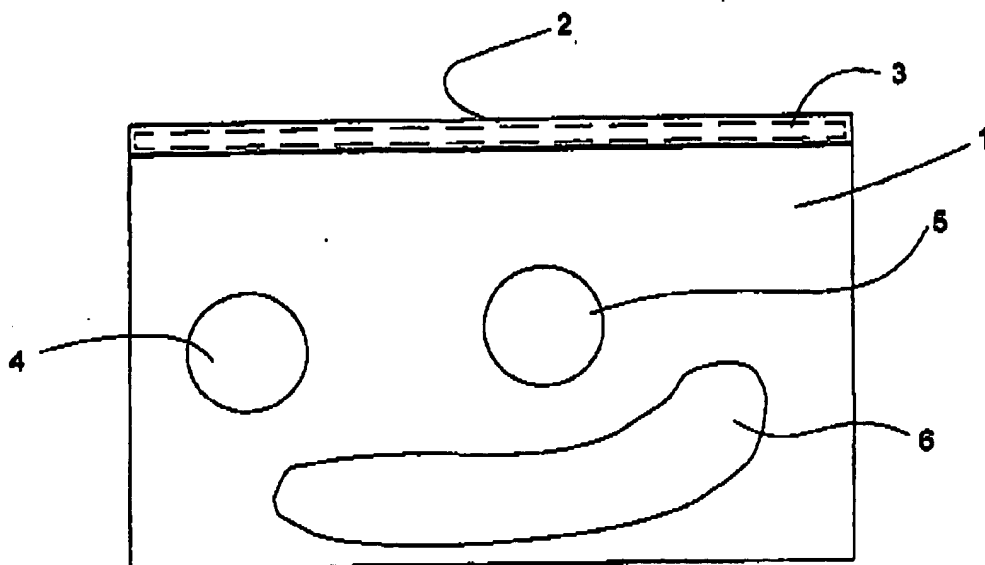


Fig. 1

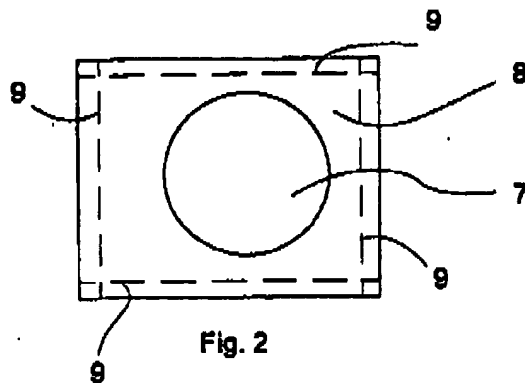


Fig. 2

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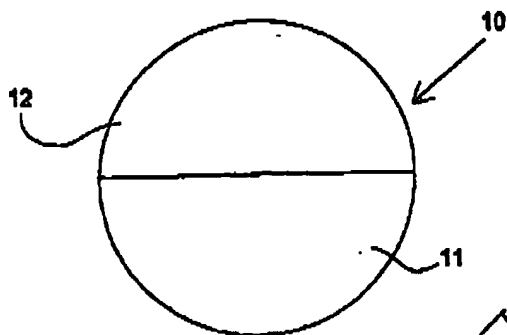


Fig. 3

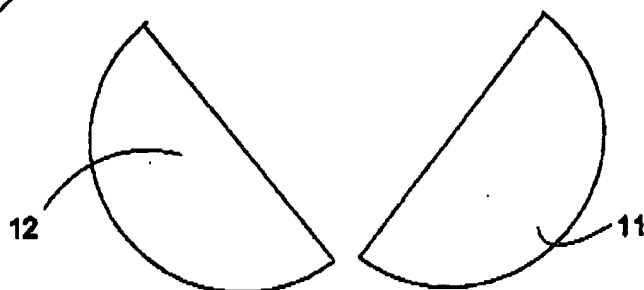


Fig. 4

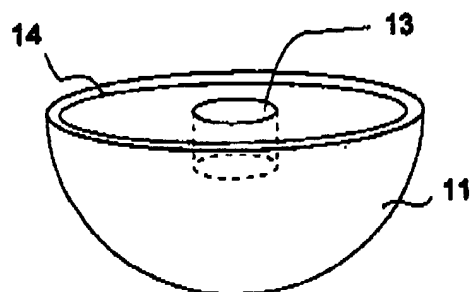


Fig. 5

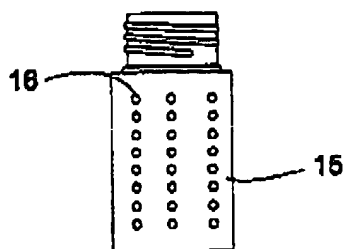


Fig. 6

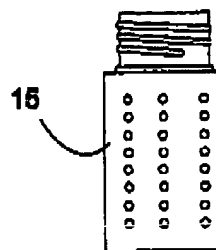


Fig. 7

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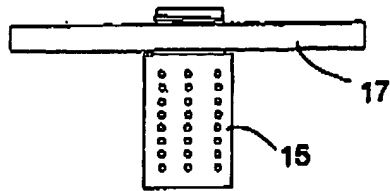


Fig. 8

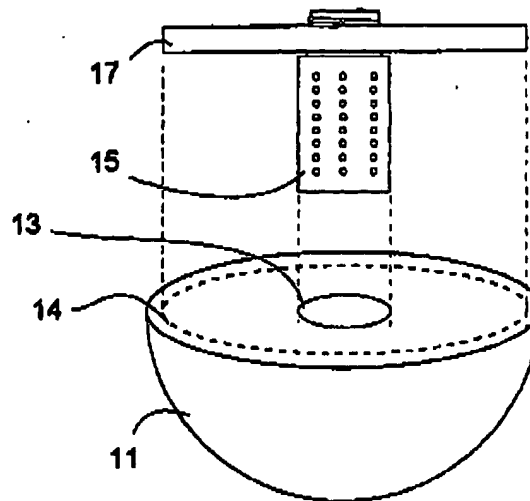


Fig. 9

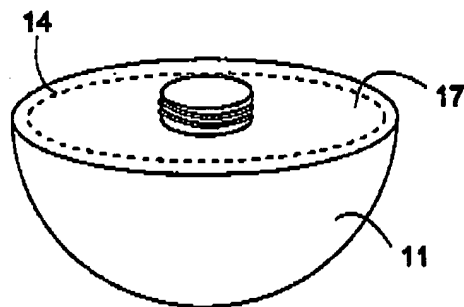


Fig. 10

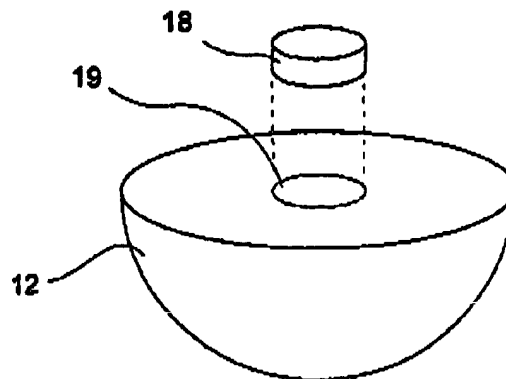


Fig. 11

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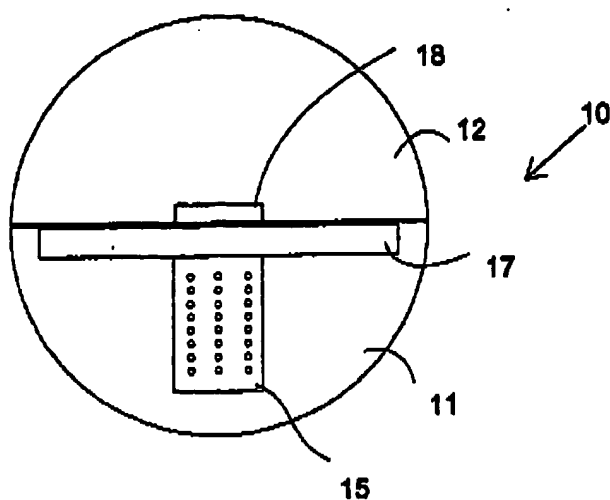


Fig. 12

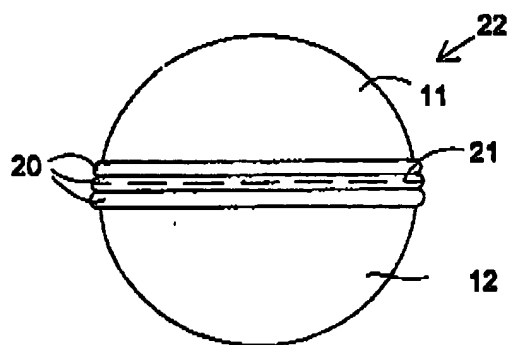


Fig. 13

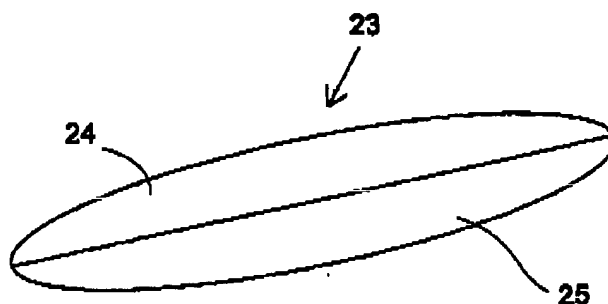


Fig. 14

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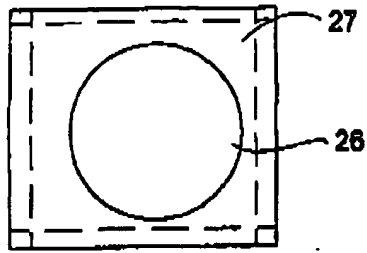


Fig. 15

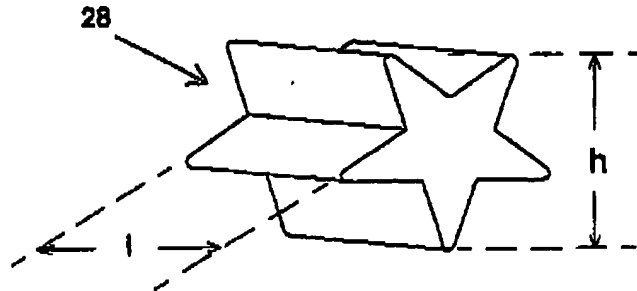


Fig. 16

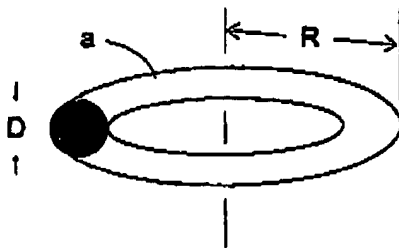


Fig. 17

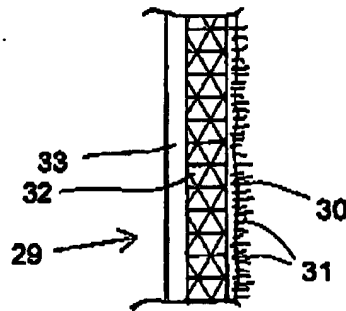


Fig. 18

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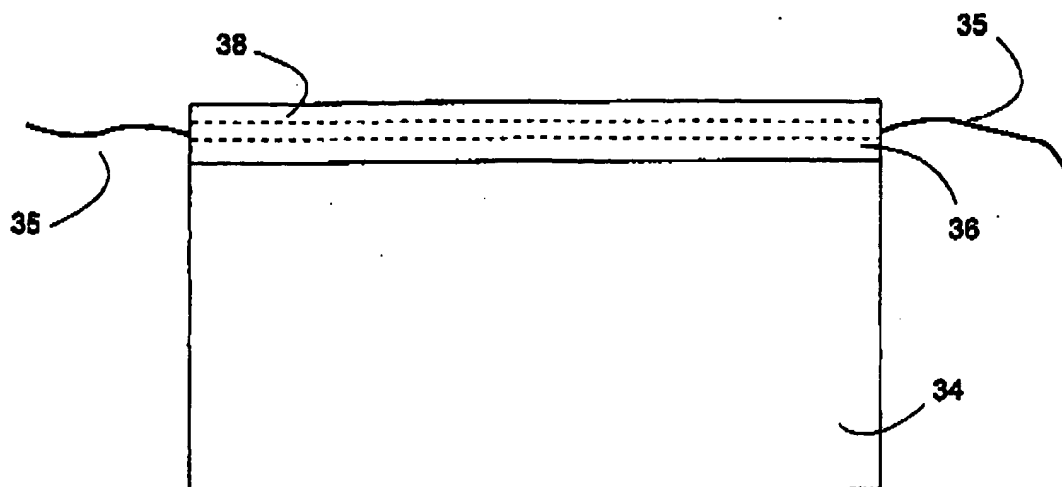


Fig. 19

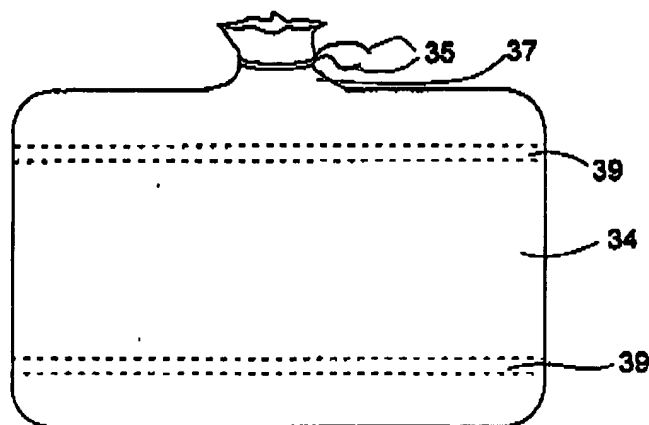


Fig. 20

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**HOME DRYER DRY CLEANING AND FRESHENING SYSTEM EMPLOYING  
DISPENSING DEVICES**

5           This invention generally relates to a system for dry cleaning and freshening garments. More particularly the present invention relates to a dry cleaning and freshening system which utilizes a dryer apparatus, as well as a method of dry cleaning and freshening garments, particularly in a domestic setting.

10           Certain methods and compositions useful for dry cleaning and freshening garments have been described in the relevant prior art. These include those discussed in the following documents: U.S. Patent No. 5,238,587; U.S. Patent No. 4,336,024; US 3,432,253. However, each of these methods are not without their shortcomings.

          Accordingly, there is a need for a dryer dry cleaning and freshening system employing an absorbent material which is capable of absorbing a sufficient amount of dry-cleaning fluid.

15          Further, there is a need for a dryer dry cleaning and freshening system which does not result in the deposition of a visible residue on the garment to be cleaned. Additionally, there is a need for a dryer dry cleaning and freshening system employing low temperature levels. There is a need for the above systems for use at home.

          It is an object of the invention to provide a dryer dry cleaning and freshening system, which is also inexpensive and simple to use. Such a system is useful at low temperatures, and may be used in the home.

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          It is another further object of the invention to provide a process for cleaning a soiled garment with a cleaning composition in a dryer, particularly a domestic clothes dryer.

          These and other objects of the invention are accomplished by providing a dryer dry cleaning and freshening system comprising a containment bag, a dispenser means impregnated with a liquid cleaning and/or freshening composition, and optionally an absorber means capable of absorbing loose particles and excess liquid cleaning composition.

25

          In a preferred embodiment of the invention a process for cleaning a garment with a liquid cleaning composition comprises the steps of placing into a containment bag at least one garment, a dispenser means material impregnated with the liquid cleaning and/or freshening composition and optionally an absorber means capable of absorbing loose particles and excess liquid cleaning composition in the containment bag, fastening the containment bag, tumbling the containment bag and its contents in a clothes dryer at low temperature and removing the cleaned garment from the clothes dryer and containment bag.

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The above recited process may be practiced with a liquid cleaning composition which provides a cleaning benefit to the treated garment, but may also be practiced with a liquid cleaning composition which is primarily a fragrancing composition which provides a freshening effect to treated garments with little or no cleaning benefit.

5 The above and other objects, aspects, features and advantages of the invention would be more readily apparent from the description of the preferred embodiments taken in conjunction with the accompanying drawings and appended claims.

Fig. 1 is a schematic drawing of a dryer dry cleaning and freshening system and a garment to be cleaned and freshened according to a first embodiment of the invention; and

10 Fig. 2 is a schematic drawing of a ball shaped dispenser means packaged in a vacuum-sealed pouch.

Fig. 3 through 12 illustrate various aspects of a second embodiment of an dispenser means which includes an dispensing part and an absorbing part.

15 Figs. 13 and 14 illustrate further embodiments of dispenser means which include both a dispensing part and an absorbing part.

Fig 15 illustrates a schematic drawing of a further embodiment of a ball shaped dispenser means formed of a porous polymer packaged in a vacuum-sealed pouch.

Fig. 16 and 17 depict further embodiments of exemplary dispenser means formed of porous polymers according to the invention;

20 Fig. 18 illustrates a cross-sectional view of a portion of a containment bag within the scope of the invention;

Figures 19 and 20 illustrate particular embodiments of a containment bag according to the invention.

25 Referring to Fig. 1, a dryer dry cleaning and freshening system according to the invention is shown which includes a containment bag 1, and at least a dispenser means 4 containing a liquid cleaning composition. Optionally the system may also be provided with an absorber means 5. Also illustrated is at least one garment 6 to be cleaned and/or freshened.

30 As shown in Fig. 1 the containment bag 1 has an opening 2 conveniently placed at one side thereof. With reference to containment bag 1 it may be fabricated of a material which is substantially vapor impermeable material such as a plastic or polymer material such as from a sheet or film which is sewn, as well as certain non-woven textiles and formed materials, such as TYVEK (DuPont Corp., Wilmington DE) and the like. Any conventional means for its production may be used. Such a containment bag 1 is typically seal on one or more edges in a conventional manner appropriate to the material from which it is made. Typically such sealing or fastening

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means include for example sewing, welding, melt-bonding as well as other conventional means. It is further to be understood that while a vapor impermeable material may be used in the construction of the containment bag 1, it is to be understood that such a bag itself need not be totally hermetically sealable itself and that the escape of vapors or gases from within such a

5 containment bag 1 to its exterior, such as the interior space of a clothes dryer is to be foreseen. Such an escape of vapors may occur at seams of said containment bag 1, particularly where sewn seams are present, as well as from the sealable opening 2. Alternately and less desirably, the containment bag 1 may be solely fabricated of a material which is vapor permeable, such as a

10 woven or non-woven textile material, which may be made of naturally occurring or synthetically produced fibers, as well as blends of two or more different materials. Both the vapor permeable materials and the non-vapor permeable materials may be a single layer material, or may be of a multilayer construction such as two or more layers of differing materials layered in register. Examples of such include a first layer of a non-woven material which is used in the innermost

15 layers of the containment bag 1, which is in turn layered with a non-woven material such as a polymer film layer which desirably provides a vapor impermeable barrier layer to the containment bag. A second example of multilayer containment bag construction includes a first innermost layer which is a fibrous material, such as a non-woven material and a second layer in register therewith of a non-woven vapor impermeable synthetic paper-like material such as TYVEK material which is used to form the exterior of the containment bag 1. Such a construction

20 provides the advantage of providing a vapor impermeable containment bag 1, which has a durable exterior layer which in turn increases the operating life of such a containment bag. Further, the exterior material made of TYVEK or a similar material is readily printable using known art techniques which permits the printing of a legend, logo or instructions for use on this exterior surface of the containment bag 1. A third preferred material of construction useful in the

25 fabrication of a containment bag 1 is a two or three layered construction, wherein the first and innermost layer of the containment bag 1 is of a non-woven, fibrous material such as of a synthetically produced fiber, which in turn is bonded to a second spun bonded polymeric textile material, which imparts strength to such a containment bag construction. Optionally, but desirably a third layer of a non-woven, fibrous material is bonded to the remaining side of the

30 spun bonded polymeric textile material and thus forms the exterior of the containment bag 1. The fibrous material used in the formation of this third layer may be of the same synthetically produced fiber of the first, innermost layer or it may be of a different fiber. Such multilayered material having at least layer of a substantially vapor impermeable layer are advantageously used in producing the containment bag 1 of the invention.

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A preferred material of construction for the fabrication of the containment bag is a bilayered material which includes a vapor impermeable or poorly vapor permeable polymeric film as a first layer, which is bonded to a second layer of a polymeric spun bonded nonwoven textile material. Both the polymeric film and the polymeric spun bonded nonwoven textile material may be produced from a variety of known art polymers and copolymers including for example nylons, polyalkylene terephthalates, rayon, as well as polyolefins especially polyethylene, polypropylene and polybutylene being of particular advantage due to their low cost and ready fabrication into both vapor impermeable films as well as nonwoven textile materials. The bonding between these layers may be accomplished by virtually any known means, including for example heat bonding, resin bonding which may require the use of a bonding material or film intermediate to the first film layer and second film layers, as well as ultrasonic bonding methods which provide effective binding between these two materials and which may be practiced to produce an attractive dimpled appearance on the final material. In accordance with this preferred embodiment, the containment bag 1 is constructed such that the first film layer forms the interior of the containment bag and the polymeric spun bonded nonwoven textile material layer forms the exterior of the containment bag. A first advantage of this preferred containment bag construction is that the interior film layer of the bag is both vapor impermeable and is nonabsorbent of the liquid cleaning and /or freshening composition and thus the maximum efficacy of these compositions is available to the clothes or other textiles being treated in the process according to the invention as little or none is absorbed by the containment bag. A second advantage of this preferred construction is the inventors' observation that such a containment bag billows sufficiently during the tumbling and heating it encounters in the dryer apparatus, yet permits the escape of vapors produced or entrapped within the containment bag to escape at an acceptable rate. A third advantage enjoyed by this preferred construction is the durability of such a containment bag as the nonwoven film layer which forms the exterior of the bag is resistant to tearing, and at the same time the soft tactile characteristics of this layer make the bag especially attractive from the standpoint of the consumer.

Other advantageous materials of construction for the fabrication of containment bags which are alternative especially preferred embodiments having a vapor impermeable or poorly vapor permeable bilayered material which has on its first layer a polymeric film, which is bonded to a second layer of a textile material include for example: a first vapor impermeable layer of a copolymer film for a film formed from a blend of polymers including for example: polyethylene terephthalate - polybutylene terephthalate; polyethylene terephthalate - rayon which are in turn bonded to second layer of a polymeric nonwoven textile material which may be for example:

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rayon, and spun bonded or melt blown polyethylene or polypropylene textile materials. Such materials of construction useful for the fabrication of containment bags which may be produced from these immediately above recited include: a first layer of a polyolefin film, such as polyethylene or polypropylene bonded to a second layer of a textile material based on a blend of rayon and polyethylene terephthalate; and, a first layer of a polyalkylene terephthalate film, bonded to a second layer of a rayon textile material.

It is to be understood that in any of the containment bag constructions recited which include one or more polymeric materials, that minor amounts of conventional additives may be included in the polymeric materials in conventional amounts including but not limited to: colorants, heat stabilizers, ultraviolet stabilizers and filler materials. Such are, per se, known to the art.

Both the first layers and the second layers, as well as any further layers, may be of the same or different thicknesses, and it is required only that the containment bag formed from these materials be flexible. Most desirably however, the thicknesses of the first, second layer and any further layers are less than about 20 mils, more desirably the thickness of the vapor impermeable layer is 5 mils and less, especially 3 mils and less, while the thickness of the second and any further layers is each about 5 mils and less.

The dimensions of the containment bag according to the invention and its internal volume may vary considerably. Desirably however, the containment bag is sufficiently large to contain at least one garment or textile to be treated, but preferably 2 - 3 such garments, as well as the absorber means being taught herein, while at the same time not be overly large and thus be inconvenient for use in a domestic dryer apparatus. Advantageously the containment bag has a volume of about 75 litres or less, with sizes of about 50 liters, and about 30 liters being preferred. With reference again to Fig. 1, the opening 2 of the containment bag 1 is conveniently located at an edge of the containment bag 1, but it may be located elsewhere.. The opening 2 may be a simple slit or discontinuity in the material of the bag's construction or it may take a more complex form such as further including a foldable flap to close the bag. Fastening means 3 may be provided to seal the containment bag 1 as well. Suitable fastening means 3 may be any useful fastening means known to the art including, but not limited to one or more of the following: zippers, hook-and-loop type fasteners (VELCRO®), buttons, clips, pins, snaps, adhesive strips, as well as resealable plastic sealing elements such as two strips, one on each margin of the opening 2 when pressed together interlock to form a flexible seal. Such resealable plastic sealing elements are known to the art dealing with plastic bags and pouches, and are sometime referred to as ZIP-LOCK® type closures. Suitable fastening means 3 also includes the use of a simple drawstring

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to pull the opening 2 shut, the use of a single deformable wire-type "twist tie" to close the opening 2, as well as the use of one or more fastening means 3 in conjunction with a flap. Further conventionally known fastening means 3 although not elucidated here may also be used. In accordance with the convenient placement of the opening 2 at or near an edge of the containment bag 1, the fastening means 3 is placed at or about the edge of the bag as illustrated on Fig. 1. It is only required that the selected fastening means be affixable onto the materials of construction used to fabricate the containment bag 1, and that it form a relatively secure closure. Desirably, the containment bag 1 is closeable to provide a liquid seal to minimize the leakage of any liquid cleaning composition out of said bag and into the dryer, which in turn ensures that maximum cleaning effect is imparted to garments or other textile materials being treated.

As is illustrated on Figure 1, the system according to a first embodiment of the invention further includes within the interior of the containment bag 1 a dispenser means 4 which is an article preferentially fabricated of a porous material which prior to the cleaning operation to be described more fully below is at least partially saturated, but desirably is completely saturated with a liquid cleaning composition. The system optionally but in some cases desirably further includes an absorber means 5 which is fabricated of a material capable of absorbing loose particles and excess liquid cleaning composition.

The dispenser means 4 is an article which may be formed of a porous material which may entrain within a quantity of a liquid cleaning composition. The porous material is desirably a readily compressible foamed material such as is conventionally used in the production of synthetic sponges as well as other foamed polymeric materials known to the art. It is required only that such foamed polymeric materials be compressible, preferably readily manually compressible, and that they be absorbent of the liquid cleaning composition. Desirably, the dispenser means 4 is an absorbent foam ball as shown in Fig. 1, or in an equally preferred alternative is an absorbent foam cube, both of which are impregnable with the cleaning composition to be used in the process. Exemplary useful foamed polymeric materials include polycelluloses and polyethers.

When present, the absorber means 5 may be formed from of the same material as the dispenser means 4, or may be made of a different material. Such absorber means 5 although shown as a ball in Fig. 1 may take a variety of forms including sheets, pads, flakes, small or large spheres as well as finely comminuted absorbent solids such as those produced from absorbent polymers as well as various grades of cellulose, including cellulose materials derived from wood such as sawdust. Wherein a containment bag 1 construction is used having an absorbent fibrous layer forming the innermost layer of the bag, such fibrous layer has been observed to provide

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both good soil and particulate entrainment effects as well as good liquid absorbency aspects and may be used as the absorber means 5. The omission of an absorber means 5 may be desired, as it eliminates the requirement that it be separated from the cleaned garments and textiles at the conclusion of the process described in more detail following. When present, desirably the absorber means 5 may be formed of a foamed polymer material in the shape of a ball such as is illustrated on Figure 1 or in the shape of a cube, or is in the form of a sheet or pad particularly a flexible square or rectangular sheet or pad of a foamed polymer material or a nonwoven polymer material (not shown).

Where an absorber means 5 is present, it is contemplated that an amount of a fragrance or fragrancing composition may be absorbed within, which may provide a further fragrancing effect to the garment being treated in the process according to the invention.

For sake of convenience, the dispenser means 4 may be packaged in a preimpregnated form wherein it comprises a quantity of a liquid cleaning composition. A convenient packaging form is shown on Fig. 2, wherein the preimpregnated dispenser means 7 is packaged in an envelope formed of a polymeric film 8 which is impermeable to the liquid cleaning composition. The envelope of polymeric film 8 includes sealed margins 9 which may be folds or seams, such as heat sealed or glued seams. In use, a consumer need only open the envelope of polymeric film 8, withdraw the preimpregnated dispenser means 7 and insert it into a containment bag with one or more garments.

Fig. 3 through 12 illustrate various aspects of a second embodiment of an dispenser means which includes an dispensing part and an absorbing part, which may be used in the place of the dispenser means 4, and when present the absorber means 5 according to Figures 1 and 2, as well as in the cleaning process being taught herein.

According to this second preferred embodiment therein is provided a single unit dispenser and absorber means 10 which comprises a dispensing part 11 with an absorbent material on at least part of its outer surface, an inner container (not shown) for holding a quantity of a liquid cleaning composition, and a retaining part 12 having an absorbent material on at least part of its outer surface which is capable of absorbing loose particles and excess liquid cleaning composition. The absorbent material of the dispensing part 11 and the retaining part 12, may be made of a variety of materials but are most preferably made of an absorbent foam, including for example foamable polymers. These may be the same or different from those recited above. The single unit dispenser and absorber means 10 is also desirably shaped like a ball which splits into two hemispherical parts as illustrated in Fig. 4. The dispensing part 11 and the retaining part 12 may be of different colors so to provide a visual indicator of these two parts.

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The single unit dispenser and absorber means 10 it is reusable as the container may be refilled and the single unit dispenser and absorber means 10 may be cleaned between uses.

Fig. 5 illustrates the dispensing part 11 of the single unit dispenser and absorber means 10 according to this second embodiment. As is illustrated, the dispensing part 11 includes a cavity 13 dimensioned for receiving the container. Additionally an annular incision 14 may be made at a distance from the edge of the dispensing part 11, which is desirably a foam hemisphere, which is adapted to receive a securing means discussed hereafter.

Fig. 6 illustrates the an embodiment of a container 15 which may be embedded in the cavity 13 of the dispensing part 11. The container 15 comprises one or more holes 16 which permit the passage of the liquid cleaning composition contained within said container to exit and pass into the dispensing part 11. In such a manner, a liquid cleaning composition may impregnate the dispensing part 11. According to this specific embodiment, the container 15 is advantageously a polymeric bottle having sufficient volume for containing approximately 0.25 - 0.5 ounce of the liquid cleaning composition, but other larger and smaller bottles as well as ones of different configuration than that shown may be used. As illustrated in Fig. 7, the container 15 is advantageously attached to a securing means 17 having a hole passing therethrough which is generally in the form of a disk which may be formed from any substantially rigid material, such as a metal or a plastic. Herein there is illustrated a as the securing means 17 a conventional metal flint-glass jar lid having a suitably dimensioned hole roughly in its center so to receive a part of the container 15, such as the neck thereof. The container 15 and the securing means 17 may be affixed to one another by such as by inserting the securing means 17 to encompass a part of the neck of the container 15 and subsequently screwing on the cap of the container 15 (or otherwise capping the container 15) which denies the disengagement of the securing means 17. Alternatively an adhesive such as an epoxy, thermoplastic glue or the like in order may be used to secure the secure the container 15 (or its cap) to the securing means 17. Desirably, ultimately the container 15 and the securing means 17 are affixed in the form illustrated on Fig. 8, which shows the neck of the container 15 passing through the hole in the securing means 17.

As is depicted on Fig. 9, the container 15 and the securing means 17 may be inserted into the cavity 13 in the dispensing part 11, which according to the preferred embodiment described herein, is a foam hemisphere. Such an assembled construction is illustrated on Fig. 10. Again, the use of an adhesive as described above may be used to secure the various elements in a fixed relation to one another. It is to be noted that the securing means 8, having a circular shape as illustrated, contributes to the maintenance of the overall shape of the dispensing part 11 as well as that of the single unit dispenser and absorber means 10 overall. It is also to be noted that when

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the annular incision 14 is present, that the securing means 17 may be recessed and fits within the annular incision 14 which permits the compression of part of the dispensing part without deforming the periphery thereof.

Fig. 11 illustrates a preferred embodiment of a retaining part 12 has at least a part of its surface fabricated of absorbent material as has been described above with reference to the dispensing part 11, but desirably is a polymeric foam. The retaining part 12 is desirably capable of entraining or entrapping loose particles and/or absorbing excess liquid cleaning composition. As is shown on Fig. 11, a cavity 19 is present in this retaining part 12, which is dimensioned to receive a cap 18 (or other capping device) appropriate for sealing the container 15. The cap 18 is inserted in the recess 19, and desirably an adhesive including one or more of those described above may be utilized to secure the cap 18 to the retaining part 12. In such a manner, by screwing the cap 18 onto the container 15 in a conventional manner, (or otherwise capping the container 15) the hemispherical absorbing part 11 and the hemispherical retaining part 12 are easily connected to each other, and thereby forming a spherically shaped a single unit dispenser and absorber means as is shown on Figure 3.

It is to be understood however, than other releasable means may be used in place of or in addition to the cap 18 (or other capping device) and the container 15 to releasably connect the absorbing part 11 to the retaining part 12 such as the use of conventional fastening means including by way of example, clips, pins, magnets as well as hook-and-loop type fasteners often referred to as VELCRO® fasteners.

Fig. 12 is a depiction of a cross-sectional view of a single unit dispenser and absorber means 10 according to the second preferred embodiment of the present invention, and which generally corresponds to that illustrated on Fig. 1. Depicted thereon is the relationship of the elements discussed above.

Fig. 13 is depicts a side view of an alternative embodiment of the single unit dispenser and absorber means 22 which is generally in accordance with the single unit dispenser and absorber means 10 generally discussed with reference to Figs. 3 - 12. According to the embodiment illustrated in Fig. 13, there are included three rings generally indicated as 20 provide a grip for screwing and unscrewing the hemispherical dispensing part 11 and hemispherical absorbing part 12, each made of an absorbent polymeric foam. Dashed line 21 indicates approximately where the shaped single unit dispenser and absorber means will separate into to approximately equal hemispherical parts when unscrewed or otherwise separated. Such rings 20 are desirably stiffer than the materials from which the dispensing part 11 and absorbing part 12 are made and thus contribute to retaining the overall shape of the single unit dispenser and



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absorbing means. Such rings for example, may be understood to be the edges of separate rigid disks, and it is also to be appreciated that only two disks may be present with one of each disks attached to either the dispensing part or the absorbing part. Although not shown, it is to be understood that the interior of this ball shaped single unit dispenser and absorber means included within its interior a container suitable for containing and releasing a quantity of a cleaning composition.

Fig. 14 illustrates a still further alternative embodiment of a single unit dispenser and absorber means 23 in accordance with the present invention which is generally in accordance with the single unit dispenser and absorber means 10 generally discussed with reference to Figs. 3 - 12.

10 The single unit dispenser and absorber means 25 is shaped as a saucer which splits into two parts: a dispensing part 25 formed of an absorbent material and a retaining part 24 of absorbent material. Although not shown, the single unit dispenser and absorber means includes a container suitable for containing and releasing a quantity of a cleaning composition within its interior, and that the dispensing part 25 and the retaining part 24 are releasably attachable to one another in the

15 manner described in reference to the embodiment discussed on Figs. 3 - 12

In accordance with a process according to the invention any of the single unit dispenser and absorber means 10, 22, 23 described above is useful in conjunction with a dry cleaning and freshening system, which system further includes a containment bag and a quantity of liquid cleaning composition. The liquid cleaning composition may be provided in a separate flask or

20 container from which it may be provided to the container on the interior of the single unit dispenser and absorber means 10, 22, 23 prior to its use.

As is illustrated on Figures 15, 16 and 17 are further preferred embodiments of dispenser means according to the invention, which may be used in the place of the dispenser means 4 according to Figures 1, as well in the process being taught herein.

25 Turning to Fig. 15, therein is depicted a dispenser means 26 is fabricated from a porous polymeric material. The dispenser means 26 may be produced from any polymer which may be made into a porous construction such as by molding it in such a manner that internal voids or internal passage are present which are effective in entraining or absorbing a quantity of the liquid cleaning composition. Advantageously the dispenser means 26 is produced by sintering polymer

30 particles into a larger mass, preferably an article which is absorbent as described, and which does not deleteriously decompose, flow or melt during the process described herein. For the sake of illustration, such useful polymers and copolymers include those discussed in "Lange's Handbook of Chemistry, pps. 10.1 - 10.62, 14 Ed. (1992) may be used, of which polyolefins such as polyethylene, polybutylene, polypropylene are preferred due to their low cost and sinterability

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into the articles useful as the dispenser means 26 being taught herein. Such sintered polymeric materials are not readily compressible, particularly are not readily manually compressible. Desirably, the dispenser means 26 is an absorbent polymeric ball as depicted on Figure 15 but it may also take a substantially different shape, such as generally flat two-dimensional shape such as

5 a circular plate or circular ring, or substantially three dimensional shapes, such as a "star" type configuration as depicted on Fig. 16, or the toroidal shape 'a' illustrated on Fig. 17. Prior to the cleaning operation to be described more fully below, the dispenser means of a porous polymeric material, particularly of a sintered polymeric material is at least partially saturated, but desirably is completely saturated with a liquid cleaning composition.

10 Particularly useful to form such a porous polymeric dispenser means are polyolefins and when in the shape of a ball or sphere as shown on Fig. 15, desirably have a radius of less than about 10 cm, preferably less than about 7 cm. In the alternative embodiment illustrated on Fig. 16, and with reference to the dimensions shown therein, "h" is preferably less than about 7 cm, and more preferably is about 5 cm and less, while "l" is preferably about 12 cm, but more

15 preferably it is about 7 cm and less. With regard to the further embodiment illustrated on Fig. 17, and with reference to the dimensions shown therein, "D" which represents a cross-section of the torus 'a' is preferably less than about 7 cm, and more preferably is about 5 cm and less, while the radius "R" of the torus 'a' is preferably about 12 cm, but more preferably it is about 7 cm and less. The inventors have observed that increases in the dimensions than those elucidated above

20 are proportionately undesirable as the mass of such dispenser means is proportionately increased which has the undesirable effect of abrading or forming impact marks on the garments being treated.

A preferred packaging construction is illustrated on Figure 15, where there is shown a spherical dispenser means 26 sealed in a pouch 27 made of any of a variety of polymer films,

25 and, may be packaged in essentially the same manner as described with reference to the embodiment described in Fig. 2. The dispenser means 26 may be provided in a dry state, that is to say without any liquid cleaning composition impregnated within, but which may be provided to the dispenser means 4 by the consumer at a later time but is preferably the dispenser means 26 is provided already containing a quantity of a cleaning composition entrained or absorbed within.

30 Such a latter embodiment is particularly easy to use by the consumer who need only open the sealed pouch 27 and provide the contents thereof into a containment bag as taught herein and at least one garment requiring cleaning and/or freshening.

Any of the dispenser means formed of a porous polymeric material may be used with the optional absorber means such as is described with reference to Fig. 1, as well as with any

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embodiment of a containment bag taught in this specification in order to practice the cleaning and/or freshening processes also taught herein.

Fig. 18 illustrates a cross-sectional view of a portion of a containment bag 29 within the scope of the invention which is of a laminated tri-layer construction. The first layer 30 is formed of a woven or non-woven textile material which includes raised fibers 31 which forms a nap which is useful in entraining and entrapping loose particulates and soils which may be released from the garments being treated. This first layer 30 need not be substantially vapor impermeable. The portion 29 also includes at least one further layer 32 or 33 which is laminated to the first layer 30 and which is substantially vapor impermeable. For example, the first layer 30 may be directly bonded to a second layer 32 which is substantially vapor impermeable, which in turn is directly bonded to a third layer 33 which may be a coating, film or other printable layer which may be, but need not be vapor impermeable. In an alternative, the portion of the containment bag 29 includes a first layer 30 is formed of a woven or non-woven textile material, bonded to a second layer 32 which is an absorbent woven or non-woven textile material, in turn bonded to a third layer 33 which is a substantially vapor impermeable layer. Still further, the portion of the containment bag 29 includes a first layer 30 is formed of a woven or non-woven textile material, bonded to a second layer 32 which is a substantially vapor impermeable layer, in turn bonded to a third layer 33 which is turn an absorbent woven or non-woven textile material providing a pleasant tactile feel to the consumer. The individual layers may be of the same or different thicknesses, and it is required only that the containment bag formed therefrom be flexible.

An exemplary embodiment of a containment bag which may be used in conjunction with any of the dispenser means described above in the process according to the invention is illustrated on Figs. 19 and 20.

As is illustrated on Fig. 19 the containment bag 34 may be constructed to include as its fastener means a drawstring 35 inserted in a corresponding sheath 38. The ends of the drawstring 35 may be simply pulled to gather the top of the containment bag 34 as shown in Fig. 20. The ends of the drawstring may then be tied and/or wrapped around the top of the containment bag 34 to form a throat 37 as shown in Fig. 20. In order to improve the sealing properties of the containment bag 34, a soft compressible sponge-like material (not shown) is advantageously located around the opening of the containment bag 1 on the inside of the bag to provide a seal. This sponge-like material 6 may be a compressible foamed polymer as described above, or may be a laminated structure. The containment bag 34 may be sized so that more than one garment fits within, and it is formed of a material which is liquid-and vapor impermeable, and desirably is also

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one which also has a textile-like feel. The materials of construction may be any of those recited above. The bag 34 itself need not be totally hermetically sealable.

In the embodiment described, the containment bag 34 desirably further includes a flexible support structure such as one or more plastic rings 39 as is illustrated by the dotted lines on Fig. 20. The interior of the containment bag 34 may include one or more loops, sleeves or other means for retaining the flexible support structure in a fixed position with respect to the containment bag 34. These flexible rings 39 are useful as aiding in the support of the shape of the containment bag 34. The containment bag 34 of may be reusable, and is washable in a conventional laundering process. The containment bag 34 may be reused a limited number of times before it needs to be washed. Where the containment bag 34 is washed, the flexible support structure, namely the flexible rings 39 may be removed from the containment bag 34 prior to being washed in a washing machine.

As with any of the embodiments of the containment bag previously discussed in this specification, the dimensions of the containment bag 1 and its internal volume may vary considerably. Desirably however, the containment bag 1 is sufficiently large to contain at least one garment or textile to be treated, but preferably 2 - 3 such garments, as well as the absorber means being taught herein, while at the same time not be overly large and thus be inconvenient for use in a domestic dryer apparatus. Advantageously the containment bag 34 has a volume of about 75 litres or less, with sizes of about 50 liters, and about 30 liters being preferred.

The liquid cleaning composition which may be used in the system being taught herein may be one or more of those known to the art. Generally, such a cleaning composition includes one or more organic solvents to aid in the dissolution of soils from a garment or textile, one or more surfactants, and may also include a fragrance composition to impart a specific scent or particular odor to the garments and which masks other odors, such as any undesirable chemical odors.

The dry cleaning and freshening system taught here advantageously may be used at home and provides for the removal of spots, freshening and dewrinkling of clothing garments without the expense and inconvenience of taking soiled or stale-smelling clothes to a commercial dry cleaning establishment and picking the clothes up. The dryer dry cleaning and freshening system of the invention permits the user to lightly clean and freshen garments at home in a clothes dryer between dry cleaner visits. This reduces the overall cost of dry cleaning.

The garments which can be cleaned may include clothing, linens, draperies, rugs, usually small rugs, upholstery covers, and the like. The soiled garments may be stale-smelling due to

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odors such as tobacco smoke, residue, perfume, and perspiration. Additionally, the soiled garments may have visible spots and stains.

The dryer dry cleaning system of the present invention may be employed using a conventional home rotary hot air clothes dryer. However, any device that can tumble the system while supplying low heat without dispensing water may be used.

In one embodiment which is amongst preferred embodiments, a dispenser means fabricated in the shape of balls or cubes from a spongy foam material as referred to in Fig. 1 and 2, or of a porous polymeric material which is not readily compressible, such as a dispenser means formed from a sintered polyolefin as referred to in Fig. 15 - 17 is provided. When packaged one or several such dispenser means may be provided with one or several absorber means, individually or severally in vapor and liquid impermeable pouches or other containers to prevent leaking of the cleaning composition during storage. A preferred packaging construction is illustrated on Figure 2. In operation, the user opens one pouch containing a dispenser means impregnated with liquid cleaning composition. The dispenser means is placed in the containment bag with one or more garments or textiles to be cleaned and freshened, and the containment bag is fastened shut. The thus loaded containment bag is then inserted into a conventional domestic clothes dryer and tumbled at a low temperature, such as a conventional "delicate garments" for a sufficient period to ensure adequate cleaning and/or freshening of the textile and garments. Typically a period of about ten to twenty minutes on such a low temperature setting has been found to be adequate. The containment bag is removed from the clothes dryer and the garments and textiles are removed from the containment bag and placed on a hanger. The dispenser means may be discarded while the containment bag may be retained for a subsequent cleaning operation, or it too may be disposed of.

In an alternative to the above process, an absorber means especially in the shape of a ball formed from a spongy material such as referred to in Fig. 1, is also introduced into the containment bag with the dispenser means. At the end of the process, the absorber means is separated from the cleaned and freshened garments and textiles and may also be discarded. In a still further variation, the absorber means is present and is used as described in the process above, except that it is in the form of a flexible sheet of a foam material or nonwoven textile material.

Additionally, the dryer dry cleaning and freshening system of the invention may include a quantity of stain remover, which is sometimes referred to as a spot cleaning composition. Such a spot cleaning composition, interchangeably referred to as a stain remover is a composition intended to be used for the localized cleaning of a stain, as opposed to a general cleaning composition which is intended to be applied to a garment or textile's overall surface. In operation,

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the spot cleaning composition may be applied to a garment before placement in the containment bag, and useful spot cleaning compositions include those which are known to the art and which are found effective at cleaning stains.

Further, in accordance with a further alternative embodiment of the system of the invention, there may also be included an additional quantity of a general cleaning composition in excess of that which is intended to be provided by the dispenser means. Such an additional quantity of liquid cleaning composition which may be added to the containment bag and/or generally upon the surface of one or more of the garments to be cleaned before fastening the containment bag and placing it in the clothes dryer for tumbling.

In a further embodiment, the dispenser means may be impregnated with a fragrance composition alone for freshening garments, exclusive of any cleaning composition.

The present invention is used in conjunction with a liquid cleaning composition. Typically such a liquid cleaning composition comprises one or more solvents and/or one or more surfactant constituents which may be employed to solubilize stains, and such cleaning compositions may be provided as part of an aqueous, or as part of an organic fluid delivery system. Compositions which comprise a fragrance constituent, with or without additional solvents and or surfactant constituents may also be used. Such surfactants and solvent, where present are generally known to aid in the removal of soils and stains from the garment or textile being treated in the process being taught herein.

Exemplary useful liquid cleaning compositions include those which are known to the skilled practitioner in the art, and include those disclosed in any of the patents which are recited above, the contents of which are herein incorporated by reference. Especially useful liquid cleaning compositions are those used in home dry cleaning processes. A particularly advantageous useful cleaning composition is an aqueous liquid cleaning compositions comprising the following constituents per 100%wt.: 0.01 - 5%wt. (preferably 0.01 - 2.5%wt. ) nonionic surfactant which is preferably an alkoxyated primary or secondary alcohol and/or an alkoxyated phenol; 0.01 - 2.5%wt. anionic surfactant selected from alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfosuccinamates, as well as salt forms thereof; 0 - 1%wt. (preferably 0 - 0.1%wt. ) fluorosurfactant constituent including one or more of those which may be present in the spot cleaning composition; 0.01 - 7%wt. organic solvent selected from alcohols and glycol ethers especially water miscible alcohols and ethers, to 100% wt. of water, and further up to about 2% wt. (preferably 0 - 1%wt. ) of one or more optional constituents. Desirably, these compositions are aqueous in nature and comprise about 90%wt. and more of water.

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The apparatus of the invention may also be used with compositions which are known to be useful in the localized cleaning of stains, also referred to as spot cleaning and/or spot pretreatment compositions. A particularly advantageous aqueous spot cleaning composition which may be used comprises the following constituents per 100%wt: 0.1 - 10%wt. nonionic alkoxyated alcohol; 0.1 - 10%wt. nonionic alkoxyated mono- and di-alkanol amide; 0.1 - 3.5%wt. anionic surfactant especially one or more selected from alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfosuccinamates, as well as salt forms thereof; 0 - 1%wt. fluorsurfactant; 0.01 - 7%wt. alcohol solvent especially water miscible alcohols; 0.01 - 30%wt. glycol ether solvent, especially water miscible glycol ethers; to 100%wt. water. Optionally, these spot cleaning compositions may include up to about 2%wt. of one or more conventional additives such as acids, bases, pH buffers, coloring agents, fragrances and the like. Desirably, these spot cleaning compositions comprise at least about 70%wt. water.

Other compositions may be used as well including many known art compositions which include a proportion of one or more water miscible organic solvents such as one or more alcohols, polyols, ketones, or glycol ethers. Pyrrolidinone solvents are also known, as well as conventional chlorinated dry-cleaning solvent and mixtures of the foregoing as long as the final cleaning composition has a flash point above 160° F. Many known art compositions include one or more surfactants, including nonionic surfactants as well as amphoteric solvents.

Exemplary nonionic surfactants include condensation products of ethylene oxide with a hydrophobic polyoxyalkylene base formed by the condensation of propylene oxide with propylene glycol. Preferred nonionic surfactants include the condensation products of C<sub>8</sub>-C<sub>22</sub> alkyl alcohols with 2-50 moles of ethylene oxide per mole of alcohol. Preferred nonionic surfactants also include (C<sub>8</sub>-C<sub>24</sub>) fatty acid amides, e.g. the monoamides of a mixture of arachidic and behenic acid and the mono- or di-alkanolamides of (C<sub>8</sub>-C<sub>22</sub>) fatty acids. Further nonionic surfactants which may be employed include the ethylene oxide esters of C<sub>6</sub>-C<sub>12</sub> alkyl phenols such as (nonylphenoxy) polyoxyethylene ether. Other nonionics include the ethylene oxide esters of alkyl mercaptans, the ethylene oxide esters of fatty acids and the lauric ester of methoxypolyethylene glycol, the ethylene oxide ethers of fatty acid amides, the condensation products of ethylene oxide with partial fatty acid esters of sorbitol, wherein the mole ratio of ethylene oxide to the acid, phenol, amide or alcohol is about 5-50:1. Amphoteric surfactants many of which are known to the art, including (C<sub>8</sub>-C<sub>22</sub>) alkyl(dimethyl)amine oxides may also be present. Further useful amphoteric surfactants are known to the art, e.g., as disclosed in U.S. Patent No. 3,936,538

Certain general liquid cleaning compositions include certain cationic surfactants is referred to as quaternary amines, which have been found to function to function as fabric

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conditioners, reducing static cling and lint adherence. Also useful in certain general cleaning composition include certain imidazolinium salts and useful amine salts like the stearyl amine salts that are soluble in water.

- 5 Additionally water may be present in the liquid cleaning composition. Generally, sufficient water is employed to aid in the removal of water based stains.

The liquid cleaning composition and fragrance composition should be such that there is little or no skin and eye irritation and preferably, no toxicity. Preferably a sufficient quantity of liquid cleaning composition is provided to clean three garments per dry cleaning load.

- 10 The liquid cleaning composition should also exhibit a sufficiently low flash point so to minimize and for all intensive purposes eliminate the likelihood of combustion when used in the cleaning process described above.

- 15 The liquid cleaning composition may include a fragrance, deodorant, preservative, insect repellent such as cedar oil, a coloring agent, finishing agents, fumigants, lubricants, and fungicides, as long as the additives do not interfere with the operation of the composition. The liquid cleaning composition may also include amounts of a thickener or gelling agent.

- 20 As used in this specification the term "liquid cleaning composition" is to be understood to encompass cleaning compositions which may or may not include one or more "freshening" agents, typically one or more fragrances which are directed to provide a freshening effect, as well as liquid compositions which are primarily fragrancing composition which provides a "freshening" or deodorizing effect to treated garments with little or no cleaning benefit.

- 25 Although the invention has been described with reference to the preferred embodiments, it will be apparent to one skilled in the art that variations and modifications are contemplated within the spirit and scope of the invention. The drawings and the description of the preferred embodiments are made by way of example rather than to limit the scope of the invention, and it is intended to cover within the spirit and scope of the invention all such changes and modifications.

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**Claims:**

1. A dryer dry cleaning and freshening system comprising:  
5 a containment bag;  
a dispenser means impregnated with liquid cleaning composition.
2. A dryer dry cleaning and freshening system according to claim 1, wherein the  
containment bag is constructed from a vapor impermeable material.
- 10 3. A dryer dry cleaning and freshening system according to claim 1 wherein said dispenser  
means is a ball or cube shaped flexible polymeric sponge impregnated with a liquid  
cleaning composition.
- 15 4. A dryer dry cleaning and freshening system according to claim 1 wherein said dispenser  
means is a ball or cube shaped porous polymer impregnated with a liquid cleaning  
composition.
- 5 5. A dryer dry cleaning and freshening system according to claim 4 wherein the porous  
20 polymer is a sintered polyolefin.
6. A dryer dry cleaning and freshening system according to claim 1, and further comprising  
a quantity of stain remover for direct application to a stain.
- 25 7. A dryer dry cleaning and freshening system according to claim 6, wherein the stain  
remover for direct application to a stain includes the following constituents per 100%wt.:  
0.1 - 10%wt. nonionic alkoxyated alcohol; 0.1 - 10%wt. nonionic alkoxyated mono- and  
di-alkanol amide; 0.1 - 3.5%wt. anionic surfactant especially one or more selected from  
alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl  
30 sulfosuccinamates, as well as salt forms thereof; 0 - 1%wt. fluoro-surfactant; 0.01 - 7%wt.  
alcohol solvent especially water miscible alcohols; 0.01 - 30%wt. glycol ether solvent,  
especially water miscible glycol ethers; up to 2%wt. of one or more conventional  
additives such as acids, bases, pH buffers, coloring agents, fragrances, and to  
100%wt. water.

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8. A dryer dry cleaning and freshening system according to claim 1 wherein the liquid cleaning composition includes the following constituents per 100%wt:  
.01 - 5%wt. (preferably 0.01 - 2.5%wt. ) nonionic surfactant which is preferably an alkoxyated primary or secondary alcohol and/or an alkoxyated phenol;  
.01 - 2.5%wt. anionic surfactant selected from alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfosuccinamates, as well as salt forms thereof;  
0 - 1%wt. (preferably 0 - 0.1%wt. ) fluorosurfactant constituents;  
0.01 - 7%wt. organic solvent selected from alcohols and glycol ethers especially water miscible alcohols and ethers,  
up to about 2% wt. (preferably 0 - 1%wt. ) of one or more optional constituents, to 100% wt. of water.
9. The dryer dry cleaning and freshening system according to claim 8 wherein the liquid cleaning composition comprises at least 90%wt. of water.
10. A dryer dry cleaning and freshening system according to claim 1, used in a home clothes dryer.
11. A process for cleaning and/or freshening a garment with a liquid cleaning composition comprising the steps of:  
placing at least one garment, a dispenser means impregnated with said liquid cleaning composition, and optionally a absorber capable of absorbing loose particles and excess liquid cleaning composition in a containment bag;  
fastening said containment bag;  
tumbling said containment bag and contents in a clothes dryer at low temperatures; and  
removing the garment from said clothes dryer and containment bag.
12. The process according to claim 11, further comprising removing said dispenser means from vacuum sealed packages before placement in said containment bag.

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13. The process according to claim 11, further comprising applying stain remover to said garment before placement in said containment bag.
14. The process according to claim 11 wherein tumbling occurs for about 10 - 20 minutes.

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# The Patent Office

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Application No: GB 9612901.0  
Claims searched: 1-14

Examiner: Peter Davey  
Date of search: 12 September 1996

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): D1P (PB, PDA, PDB)

Int CI (Ed.6): D06F 43/00, D06M 23/00 23/02

Other: Online: WPI

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB1598911 (GOMM), see eg. claim 1	1 at least
X	EP 0429172 A1 (UNILEVER), see eg. page 2, lines 17-26 and 40-42	1 at least
X	US 3432253 (DIXON AND COPPOCK), see eg. claim 1	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.